

CLAIMS

What is claimed is:

1. A method for forming a densified composite foam, comprising the steps of:
 - a) contacting a reticulated foam skeleton with a liquid precursor; and
 - 5 b) heating the reticulated foam skeleton to pyrolyze the liquid precursor and cause a product of the pyrolyzed liquid precursor to deposit on the reticulated foam skeleton thereby forming the densified composite foam.
- 10 2. The method of Claim 1, wherein the reticulated foam skeleton includes carbon.
3. The method of Claim 2, wherein the reticulated foam skeleton is immersed in the liquid precursor.
4. The method of Claim 2, further comprising the step of pyrolyzing a polymeric foam to form the reticulated foam skeleton.
- 15 5. The method of Claim 4, wherein the polymeric foam includes a thermosetting polymer selected from the groups consisting of polyurethanes, phenolics, and polyimides.
6. The method of Claim 4, further comprising the step of using chemical vapor deposition to deposit a coating on the reticulated foam skeleton before the
20 reticulated foam skeleton is immersed in the liquid precursor.
7. The method of Claim 6, wherein the deposited coating includes carbon.

8. The method of Claim 4, further comprising the step of using chemical vapor deposition to deposit a coating on the densified composite foam after the liquid precursor is pyrolyzed and deposited on the reticulated foam skeleton.
9. A method for forming a carbon-carbon composite foam, comprising the steps of:
- 5 a) pyrolyzing a polymeric foam to form a reticulated carbon skeleton; and
- b) depositing pyrolytic carbon on the reticulated carbon skeleton to form a carbon-carbon composite foam with greater than 30% solid density.
- 10 10. The method of Claim 9, wherein the polymeric foam includes a thermosetting polymer selected from the groups consisting of polyurethanes, phenolics, and polyimides.
11. The method of Claim 9, wherein the carbon-carbon composite foam is densified to a solid density of at least about 40%.
- 15 12. The method of Claim 9, wherein the carbon-carbon composite foam is densified to a solid density of at least about 50%.
13. A carbon-carbon composite foam, comprising:
- a) an open lattice of carbon ligaments forming a network of three-dimensionally interconnected cells; and
- 20 b) a pyrolytic carbon coating on the open lattice of carbon ligaments, wherein the carbon-carbon composite foam has a solid density of greater than 30%.
14. The carbon-carbon composite foam of Claim 13, wherein the carbon-carbon

15. The carbon-carbon composite foam of Claim 14, wherein the carbon-carbon composite foam has an essentially-isotropic structure.
16. The carbon-carbon composite foam of Claim 13, wherein the open lattice of carbon ligaments consists essentially of amorphous carbon.
- 5 17. The carbon-carbon composite foam of Claim 13, wherein the carbon-carbon composite foam has a solid density of at least about 40%.
18. The carbon-carbon composite foam of Claim 13, wherein the carbon-carbon composite foam has a solid density of at least about 50%.
- 10 19. An improved clutch or brake device in which at least two members are mounted for relative rotation and engagement, the members having friction material rotatable therewith, and the friction material of the members having surfaces confronting each other, characterized in that the friction material has a solid density of greater than 30% and includes:
 - 15 a) an open lattice of carbon ligaments forming a network of three-dimensionally interconnected cells; and
 - b) a pyrolytic carbon coating on the open lattice of carbon ligaments.
20. The improved clutch or brake device of Claim 19, wherein the friction material defines a structure of interconnecting pores that allow hydraulic fluid to flow through the friction material.
- 20 21. The improved clutch or brake device of Claim 20, wherein the friction material has an essentially-isotropic structure.
22. The improved clutch or brake device of Claim 19, wherein the open lattice of